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(71) Applicant  
Hall and Pickles Limited  
(Great Britain)  
Hydra Works  
Ecclesfield  
Sheffield S30 3ZF

(72) Inventor  
Leonard Richard Green

(74) Agent and/or Address for  
Service  
Hulse and Co  
Cavendish Buildings  
West Street  
Sheffield S1 1ZZ

(54) Water spray nozzle

(57) A water spray nozzle 1 comprises a discharge head 6 at an outer end 7 of the nozzle 1, a spigot 8 extending from the discharge head 6, a water conveying bore extending along the spigot 8, a spring steel collar 17 fitted onto a portion of the spigot 8 and having wings 21 projecting beyond the spigot 8, which wings 21 are adapted, in use, to engage suitably undercut recesses 25 in a housing block 2 for accommodating the spray nozzle 1, by axial insertion of the nozzle 1 and then rotation of the nozzle 1, with reverse of this procedure to remove a nozzle 1 from its housing block 2. The nozzle can be used for dust suppression in mining, and may be mounted on a rotary coal cutting head.

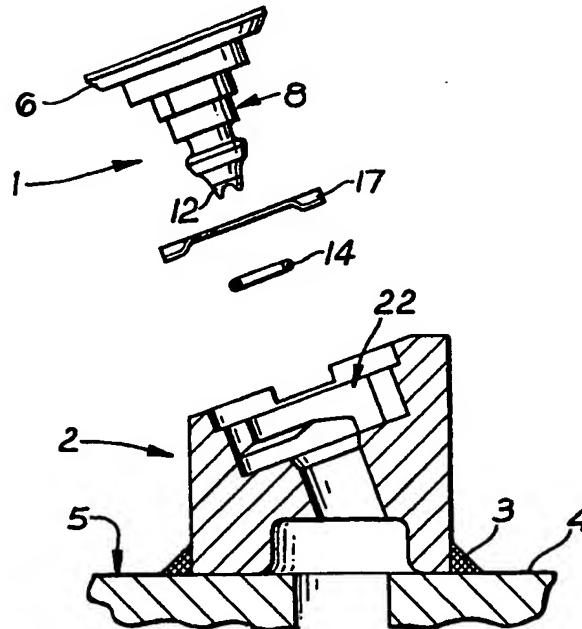


Fig. 1

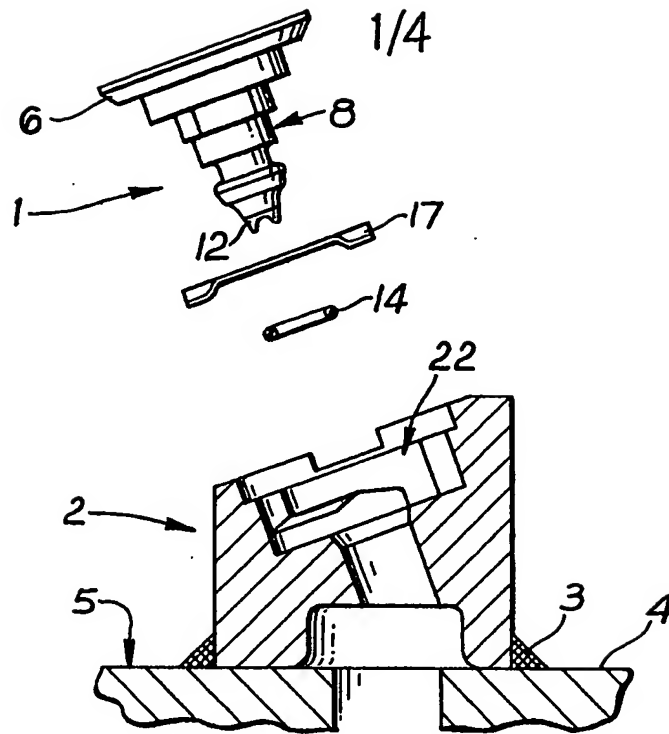


Fig. 1

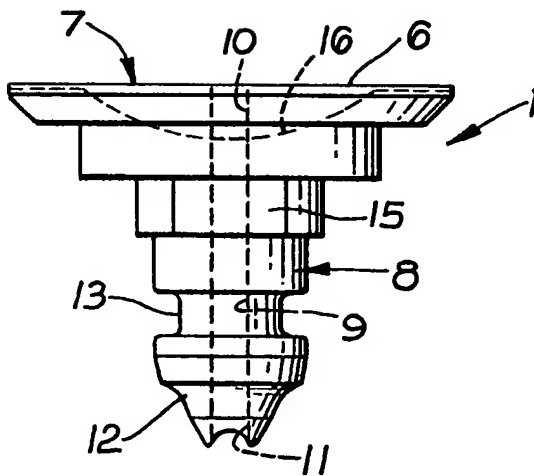


Fig. 2

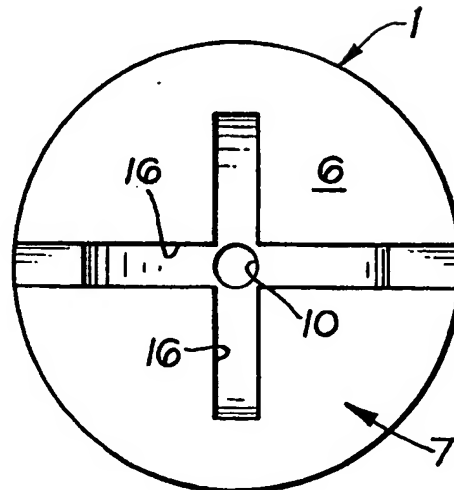


Fig. 3

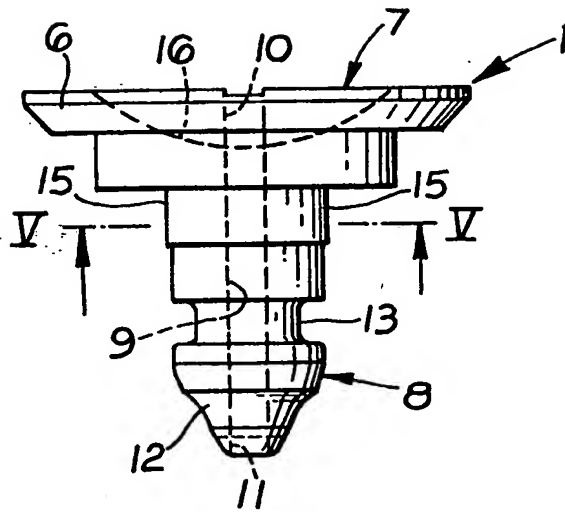


Fig. 4

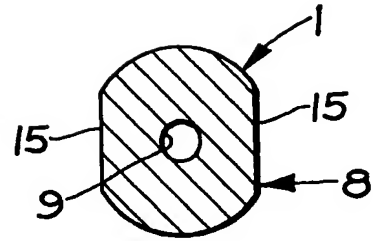


Fig. 5

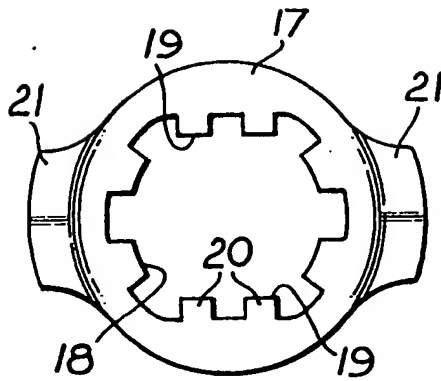


Fig. 6



Fig. 7

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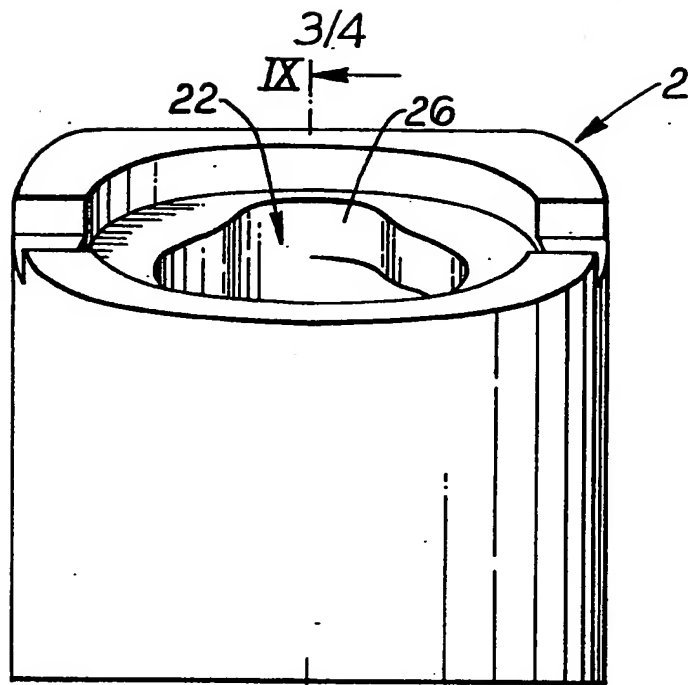


Fig. 8

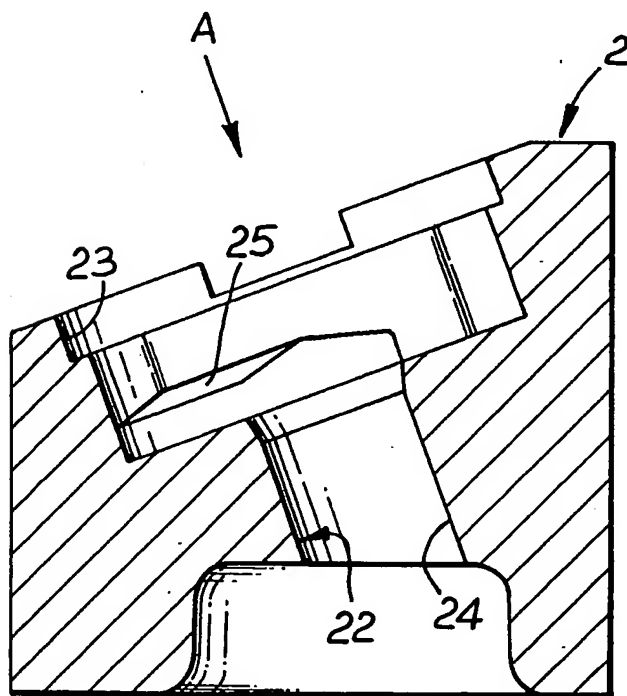
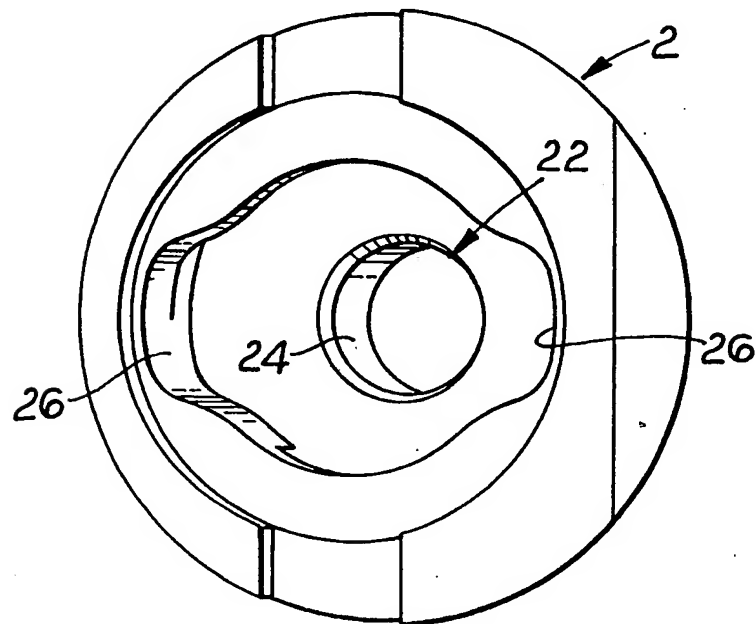
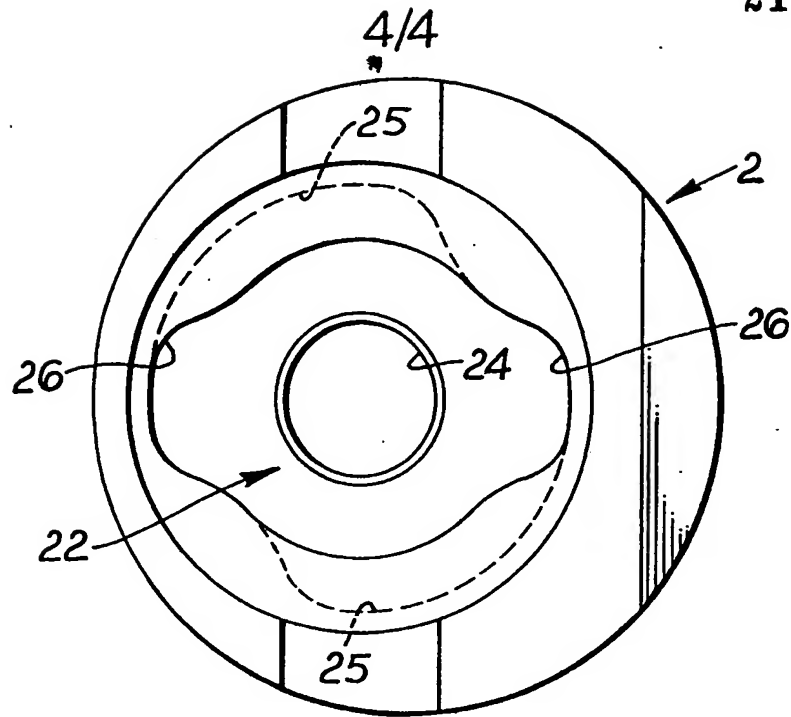


Fig. 9



## SPECIFICATION

### Water spray nozzle

- 5 This invention relates to a water spray nozzle, particularly for use in effecting dust suppression in mining, tunnelling etc., and to a nozzle and housing combination.

- In the mining of coal for instance, a pick-carrying, rotary coal cutting head is usually employed, with at least one water spray nozzle located in the vicinity of each pick. Conventionally, such nozzles have each been screwed into an individual tapped hole communicating with a water supply passageway. Not surprisingly, these water spray nozzles become blocked either externally (by coal particles, slurry etc.) or internally (by the supply of water contaminated with dirt, debris, swarf etc) but their removal, for the fitting of a replacement nozzle, is usually difficult principally because of rusting and one proposal has been for a push-fit nozzle abutting a rubber seat, which nozzle can be withdrawn by a lever action or a pushing action of a screwdriver or similar tool, and the present invention is concerned with providing a quick release, non-screwed nozzle which is insertable and removable by a simple tool such as a screwdriver.

- According to a first aspect of the present invention, there is provided a water spray nozzle comprising a discharge head at an outer end of the nozzle, a spigot extending from the discharge head, a water conveying bore extending along the spigot from an outlet end of the bore at the discharge head to an inlet end of the bore, a spring steel collar fitted onto a portion of the spigot and having wings projecting beyond the spigot, which wings are adapted, in use, to engage suitably undercut recesses in a housing block for accommodating the spray nozzle, by axial insertion of the nozzle and then rotation of the nozzle, with reverse of this procedure to remove a nozzle.

- According to a second aspect of the present invention, there is provided a water spray nozzle as defined above in combination with a nozzle housing block adapted to be welded to a rotary mineral cutting head, the housing block being provided with a nozzle receiving socket.

- Thus, the spray nozzle in accordance with the invention is retainable by a twist lock action and is fitted by axial insertion and a twist and removed by a reverse twist and axial withdrawal, the action of the spring wings ensuring that the vibrations etc., encountered in service have no effect with regard to inadvertent loss of a nozzle from its housing block.

- In detail, if the spring steel collar is provided with two wings, these may be located diametrically opposite one another although three 120° spaced wings or four 90° spaced

wings are possible.

- Conveniently, the outer end of the nozzle is notched to receive either an ordinary screwdriver blade or a Philips type blade, while the spigot may be necked, e.g. to receive a resilient water sealing ring to be compressed between the external periphery of the spigot and the internal periphery of the nozzle receiving socket. Preferably, the bore is co-axial with the spigot, while the inlet end of the bore is provided at an inner, terminal nose of the spigot, which nose projects from the spigot and decreases in cross section from the spigot. With a circular section spigot, the spring steel collar has a central aperture having two flats 180° apart to be a push fit over a selected portion of the spigot, also having two corresponding flats. The gripping action of the collar on the spigot may be enhanced by providing a series of radial slits around the aperture so as to define a plurality of inwardly projecting spring fingers, terminal ends of which engage the spigot periphery. The wings of the collar are preferably bent from the general plane of the collar, e.g. by 15°, to engage correspondingly angled surfaces of the housing recesses.

- The housing block is provided with a water conveying conduit leading to its nozzle receiving socket, and preferably, a reservoir is provided at the inlet end of the conduit for collection of any debris entrained in the supply water. For a two-winged spring collar, the undercut recesses have two open mouths located 180° apart, while innermost ends of the recesses may terminate in inclined surfaces, e.g. at 15°, so that a latching effect on the wings is attained when the nozzle is fully twisted home.

- The rotary, mineral cutting head could be either a spiral vane shearer disc for mineral winning operations, or a rock cutting head of a roadway driving machine. The head proper and/or vanes of the head are bored to define water supply passageways, with a spray nozzle housing block welded over the discharge end of such passageways.

- With the spray nozzle generally circular, this may be produced relatively cheaply by turning from bar stock, whilst the nozzle receiving block may conveniently be a precision casting.

- The invention will now be described, in greater detail, by way of example, with reference to the accompanying drawings, in which:—

- Figure 1* is an exploded, part sectional side elevation of a water spray nozzle and housing block in accordance with the invention;

- Figure 2* is an enlarged side elevation of the nozzle of *Fig. 1*;

- Figure 3* is a plan view of *Fig. 2*;

- Figure 4* is an enlarged side elevation of the nozzle of *Fig. 1* but 90° from the elevation of *Fig. 2*;

- Figure 5* is a section on the line V-V of *Fig.*

4;

Figure 6 is a plan view of the spring collar of Fig. 1;

Figure 7 is an end elevation of Fig. 6;

5 Figure 8 is a front elevation of the housing block of Fig. 1;

Figure 9 is a section on the line IX-IX of Fig. 8;

10 A of Fig. 9, and

Figure 11 is a plan view of Fig. 10.

In the drawings, a water spray nozzle 1 is adapted to be received in a housing socket 2 secured by welding 3 to a vane 4 of a

15 rotatable, mineral cutting head 5.

The nozzle is detailed in Figs. 2 to 5 and comprises an enlarged discharge head 6 located at an outer end 7 of the nozzle, with a circular section spigot 8 extending from the discharge head 6. A water conveying bore 9 extends along the spigot 8 from an outlet end 10 of the bore at the discharge head 6 to an inlet end 11 of the bore 9 located at a terminal nose 12 of the spigot 8, which nose decreases in cross-section from the spigot 8. The latter is necked at 13 to receive a resilient water sealing ring 14, while the spigot 8 is also provided with a pair of diametrically opposed flats 15, as can be seen in Figs. 2, 4 and 5. The discharge head 6 is also provided with a cruciform notch 16, to be engaged by a screwdriver blade (not shown) to enable the nozzle 1 to be rotated with respect to its housing 2.

35 The nozzle 1 is provided with a spring steel collar 17, which is detailed in Figs. 6 and 7, the collar 17 having a central aperture 18, such that it can be fitted on to the spigot 8, and the aperture 18 having a pair of diametrically opposed flats 19 to engage the spigot flats 15. The aperture 18 is also provided with a plurality of inwardly projecting, spring fingers 20. Furthermore, the collar 17 is provided with two, diametrically opposed wings 21 bent at 15° from the general plane of the collar.

The housing block 2 is detailed in Figs. 8 to 11 and comprises a socket 22 adapted to receive the nozzle 1, the socket having an enlarged, outer part 23 adapted to accommodate the discharge head 6 of the nozzle 1, and a smaller diameter inner part 24 adapted to accommodate the majority of the spigot 8. The housing block 2 is also provided with a pair of undercut recesses 25 located 180° apart to receive the wings 21 of the spring collar 17. As best seen from Figs. 10 and 11, the portion 23 of the socket 22 in Figs. 10 and 11 is provided with two open mouths 26 located 180° apart so that, with the nozzle 1 carrying its spring collar 17 and sealing ring 14, the nozzle can be pressed into the socket 22, nose 12 first, with the wings 21 of the collar 17 aligned with the mouths 26, whereupon rotation of the nozzle through 90° by a

screwdriver engaging the cruciform notch 16 results in the wings 21 being rotated into engagement with the undercut recesses 25. It follows that reverse of this procedure enables a nozzle 1 to be removed from its holder 2, e.g. for cleaning or replacement.

## CLAIMS

1. A water spray nozzle comprising a discharge head at an outer end, a spigot extending from the discharge head, a water conveying bore extending along the spigot from an outlet end of the bore at the discharge head to an inlet end of the bore, a diametrically winged, spring steel collar fitted onto a portion of the spigot and having wings projecting beyond the spigot which wings are adapted to engage suitably undercut recesses in a housing block for accommodating the spray nozzle, by axial insertion of the nozzle and then rotation of the nozzle, with reverse of this procedure to remove a nozzle.

2. A nozzle as claimed in Claim 1, wherein the spring steel collar is provided with two wings located diametrically opposite one another.

3. A nozzle as claimed in Claim 1 or Claim 2, wherein the outer ends of the nozzle is notched to receive either an ordinary screwdriver blade or a Philips type blade.

4. A nozzle as claimed in any preceding Claim, wherein the spigot is necked to receive a resilient water sealing ring to be compressed between the external periphery of the spigot and the internal periphery of the nozzle receiving socket.

5. A nozzle as claimed in any preceding Claim, wherein the bore is coaxial with the spigot.

6. A nozzle as claimed in any preceding Claim, wherein the inlet end of the bore is provided at an inner, terminal nose of the spigot, which nose projects from the spigot and decreases in cross-section from the spigot.

7. A nozzle as claimed in any preceding Claim, wherein the spigot is of circular section and the spring steel collar has a central aperture having two flats 180° apart to be a push fit over a selected portion of the spigot also having two corresponding flats.

8. A nozzle as claimed in Claim 7, wherein a series of radial slits are provided around the aperture, so as to define a plurality of inwardly projecting spring fingers, terminal ends of which engage the spigot periphery.

9. A nozzle as claimed in any preceding Claim, wherein the wings of the collar are bent from the general plane of the collar.

10. A nozzle as claimed in Claim 9, wherein the wings are bent at 15° from the general plane of the collar.

11. A nozzle as defined in any preceding Claim, in combination with a nozzle housing block adapted to be welded to a rotary min-

eral cutting head.

12. A nozzle as claimed in Claim 11, wherein the housing block is provided with a water conveying conduit leading to its socket.

5 13. A nozzle as claimed in Claim 12, wherein a reservoir is provided at the inlet end of the conduit.

10 14. A nozzle as claimed in any one of Claims 11 to 13, wherein the undercut recesses have two open mouths located 180° apart.

15. A nozzle as claimed in Claim 14, wherein the innermost ends of the recesses terminate in inclined surfaces.

15 16. A nozzle as claimed in Claim 15, wherein the inclination of the surfaces is 15°.

17. A water spray nozzle, substantially as hereinbefore described with references to Figs. 1 to 7 of the accompanying drawings.

20 18. A water spray nozzle in combination with a nozzle housing block, substantially as hereinbefore described with references to Figs. 8 to 11 of the accompanying drawings.

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